

CLAIMS

I claim:

1. A cannister-style toroidal vortex vacuum cleaner system utilizing a fluid flow, said cannister toroidal vortex vacuum cleaner comprising:

a cannister-style vacuum cleaner housing;

fluid delivery means;

separation means; and

a toroidal vortex nozzle;

wherein said fluid flow recirculates between said toroidal vortex nozzle and said separation means.

2. A cannister toroidal vortex vacuum cleaner system in accordance with claim 1 wherein said toroidal vortex nozzle is vented.

3. A cannister toroidal vortex vacuum cleaner system in accordance with claim 1 wherein said toroidal vortex nozzle is vented to prevent the formation of a plume.

4. A cannister toroidal vortex vacuum cleaner system in accordance with claim 1 wherein said toroidal vortex nozzle further comprises a brush.

5. A cannister toroidal vortex vacuum cleaner system in accordance with claim 1 wherein said toroidal vortex nozzle further comprises a rotating brush.

6. A cannister toroidal vortex vacuum cleaner system in accordance with claim 1 wherein said toroidal vortex nozzle further comprises a wheel.

5 7. A cannister toroidal vortex vacuum cleaner system in accordance with claim 1 wherein said toroidal vortex nozzle is hinged.

8. A cannister toroidal vortex vacuum cleaner system in accordance with claim 1 further comprising a hose.

9. A cannister toroidal vortex vacuum cleaner system in accordance with claim 1 having a hose being capable of being fitted with interchangeable toroidal vortex nozzle attachments.

10. A cannister toroidal vortex vacuum cleaner system in accordance with claim 1 further comprising a hose that couples said toroidal vortex nozzle to said separation means.

15 11. A cannister toroidal vortex vacuum cleaner system in accordance with claim 1 further comprising a hose of a side by side configuration.

20 12. A cannister toroidal vortex vacuum cleaner system in accordance with claim 1 further comprising a hose of a siamese twin configuration.

13. A cannister toroidal vortex vacuum cleaner system in accordance with claim 1 further comprising a hose of a concentric configuration.

14. A cannister toroidal vortex vacuum cleaner system in accordance with claim 1 further comprising a flexible hose.

15. A cannister toroidal vortex vacuum cleaner system in accordance with claim 1 having a removable hose.

5 16. A cannister toroidal vortex vacuum cleaner system in accordance with claim 1 further comprising a handle.

17. A cannister toroidal vortex vacuum cleaner system in accordance with claim 1 further comprising a container coupled to said separation means.

10 18. A cannister toroidal vortex vacuum cleaner system in accordance with claim 1 further comprising a removable container coupled to said separation means.

15 19. A cannister toroidal vortex vacuum cleaner system in accordance with claim 1 wherein said separation means is a centrifugal separator.

20. A cannister toroidal vortex vacuum cleaner system in accordance with claim 1 wherein at least one of said fluid delivery means and said separation means is disposed inside said cannister-style vacuum cleaner housing.

20 21. A cannister toroidal vortex vacuum cleaner system in accordance with claim 1 further comprising a coarse mesh trap to protect said fluid delivery means from large objects.

22. An upright-style toroidal vortex vacuum cleaner utilizing fluid flow comprising:

an upright-style vacuum cleaner housing;

fluid delivery means;

5 separation means disposed; and

a toroidal vortex nozzle;

wherein said fluid flow recirculates between said toroidal vortex nozzle and said separation means.

23. An upright toroidal vortex vacuum cleaner system in accordance with claim 22 wherein said toroidal vortex nozzle is vented.

24. An upright toroidal vortex vacuum cleaner system in accordance with claim 22 wherein said toroidal vortex nozzle is vented to prevent the formation of a plume.

15 25. An upright toroidal vortex vacuum cleaner system in accordance with claim 22 wherein said toroidal vortex nozzle further comprises a brush.

26. An upright toroidal vortex vacuum cleaner system in accordance with claim 22 wherein said toroidal vortex nozzle further comprises a rotating brush.

20 27. An upright toroidal vortex vacuum cleaner system in accordance with claim 22 wherein said toroidal vortex nozzle further comprises a wheel.

28. An upright toroidal vortex vacuum cleaner system in accordance with claim 22 wherein said toroidal vortex nozzle is hinged.

29. An upright toroidal vortex vacuum cleaner system in accordance with claim 22 further comprising a hose.

30. An upright toroidal vortex vacuum cleaner system in accordance with claim 22 further comprising a hose that connects said toroidal vortex nozzle to said separation means.

31. An upright toroidal vortex vacuum cleaner system in accordance with claim 22 further comprising a hose of a side by side configuration.

32. An upright toroidal vortex vacuum cleaner system in accordance with claim 22 further comprising a hose of a siamese twin configuration.

33. An upright toroidal vortex vacuum cleaner system in accordance with claim 22 further comprising a hose of a concentric configuration.

34. An upright toroidal vortex vacuum cleaner system in accordance with claim 22 further comprising a flexible hose.

35. An upright toroidal vortex vacuum cleaner system in accordance with claim 22 further comprising a removable hose.

36. An upright toroidal vortex vacuum cleaner system in accordance with claim 22 further comprising a removable hose

being capable of being fitted with interchangeable toroidal vortex nozzle attachments.

37. An upright toroidal vortex vacuum cleaner system in accordance with claim 22 further comprising a handle.

5 38. An upright toroidal vortex vacuum cleaner system in accordance with claim 22 further comprising a container coupled to said separation means.

39. An upright toroidal vortex vacuum cleaner system in accordance with claim 22 further comprising a removable container coupled to said separation means.

40. An upright toroidal vortex vacuum cleaner system in accordance with claim 22 wherein at least one of said fluid delivery means and said separation means is disposed inside said upright-style vacuum cleaner housing.

15 41. An upright toroidal vortex vacuum cleaner system in accordance with claim 22 further comprising a coarse mesh trap to protect said fluid delivery means from large objects.

42. A vacuum cleaner system utilizing fluid flow comprising:

20 a toroidal vortex nozzle;

a centrifugal separator; and

a container coupled to said centrifugal separator;

wherein said fluid flow recirculates between said toroidal vortex nozzle and said centrifugal separator.

43. A vacuum cleaner system in accordance with claim 42 further comprising a collector.
44. A vacuum cleaner system in accordance with claim 42 further comprising a collector, wherein the pressure in said collector is
5 greater than the pressure in said centrifugal separator.
45. A vacuum cleaner system in accordance with claim 42 wherein ingoing and outgoing flow is contained in concentric tubing.
46. A vacuum cleaner system in accordance with claim 42 wherein said fluid is generated by an impeller.
- 10 47. A vacuum cleaner system in accordance with claim 42 wherein said is generated by a centrifugal pump.
48. A vacuum cleaner system in accordance with claim 42 wherein said is generated by a propeller.
- 15 49. A vacuum cleaner system in accordance with claim 42 further comprising a collector, wherein the pressure in said collector is greater than the pressure in said centrifugal separator, wherein the difference in said pressures maintains vortex fluid flow without impeding matter from entering said collector.
50. A vacuum cleaner system in accordance with claim 42 further comprising a collector which is removable.
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51. A vacuum cleaner system in accordance with claim 42 further comprising a collector comprising a door.

52. A vacuum cleaner system in accordance with claim 42 further comprising a collector comprising a plug.

53. A vacuum cleaner system in accordance with claim 42 further comprising a coarse mesh trap to protect said fluid delivery means from large objects.

54. A method for separation of particles from fluid comprising the steps of:

delivering a fluid;

moving said fluid in a vortex; and

recirculating said fluid through a toroidal vortex nozzle.

10 55. A method in accordance with claim 51 wherein said toroidal vortex nozzle is vented.